

The Neural Network as a Decision Tree

A Metamorphic River from Input to Output

THE IDEA

At each step, the network uses binary context (decisions) to choose which linear mapping (river segment) the information flows through. The chosen segments form a path -- a **metamorphic river** -- from input to output.

KEY

- Chosen path (active)
- Other paths (not chosen)
- Decision (context bit)
- Information flows
- River flows forward

WHAT'S HAPPENING

- 1 Input enters the river.
- 2 At each rock, a decision (0 or 1) is made.
- 3 The chosen decision keeps the river flowing along one segment.
- 4 The sequence of chosen segments (blue 1s) is the metamorphic river.
- 5 The river flows to the output.



HOW TO READ THIS PICTURE

- Rocks are decisions (context bits).
- 1** Blue numbers (1) mean the path taken.
- 0** Red numbers (0) mean paths not taken.
- The river (blue) is the sequence of linear mappings composed together.

BIG PICTURE

Different inputs may take different paths.

- ♥ Each path is a sequence of best-effort linear mappings (river segments).
- ♥ The path taken for this input composes the mappings from input to output.

♥ Many possible paths. Only one path is taken for this input. That path is the metamorphic river from input to output. ♥

A metamorphic river.